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INTERNATIONAL STANDARDS—THE DESIRABILITY OF DEVELOPING INTERNATIONAL UNIFORMITY IN NOMENCLATURE AND STRENGTH OF WIDELY USED MEDICINES.*

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For many decades the better informed men in pharmacy as well as medicine have endeavored to create more widespread interest in the need for generally acceptable uniform names and standards of strength for medicinal preparations.

This need for universal standards, first recognized in the early years of the nineteenth century, was more fully appreciated when steam and electricity began to annihilate space and time so that the previously formidable obstacle of distance no longer sufficed to keep the people of different countries from intermingling.

It was pointed out at a very early period that the lack of uniformity in nomenclature and standards of strength for pharmaceutical preparations constitutes a real source of danger to the traveller, but it was soon recognized that the direct danger to the individual is of much less import than the indirect effect on the progress of the sciences of medicine.

This indirect effect has evidenced itself in many ways, not the least important of which has been the hindrance that the evident variation in name and strength of pharmaceutical preparations has been to the development of a rational materia medica and the in-

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fluence it has had on the increase of proprietary medicaments with their attending misrepresentation and fraud.

The growth of intercommunication and commerce which followed the Napoleonic wars early in the nineteenth century led to repeated attempts to secure greater uniformity in strength and nomenclature of medicaments. One of these earlier attempts is reflected by a conspectus of the several then existing pharmacopœias, dispensatories and formularies of the world, compiled by A. J. L. Jourdan, and published in 1828. A second edition of this work, in two volumes, comprising a total of more than 1450 pages, was published in 1840.

The first edition included a review of 35 official pharmacopœias and 18 formularies while the second edition included 42 pharmacopœias and 31 formularies.

Largely due to the initiative of Professor George Dragendorff, then just at the beginning of his eventful career, an International Pharmaceutical Congress was held at Brunswick, Germany, in 1865, to discuss the possibility of evolving greater uniformity in pharmacopœial requirements. This initial congress was attended by delegates from Germany, Russia, Austria, France, and Sweden. In discussing the practicability of evolving an international pharmacopœia it was pointed out that uniformity in nomenclature and in the formulæ of pharmacopœial galenicals could readily be attained if at the periodical revision of the various pharmacopœias such changes were seriously attempted.

At the second congress, held in Paris in 1867, it was proposed to compile and publish a code that would serve as a basis for international standards, and at the third congress, held in Vienna in September, 1869, it was announced that the Pharmaceutical Society of Paris had volunteered to compile a comparative epitome of national pharmacopœias showing the differences existing at that time in regard to the nomenclature, composition and strength of galenical preparations. This compilation was to be submitted to the next international congress, and, it was expected, would form the basis for an agreement to serve as a guide in future revisions of the several national pharmacopœias.

Largely because of the Franco-German war the fourth international congress was not held at the time specified and it was not until 3 years later, in 1874, that the congress met in St. Petersburg.

The Society of Pharmacy of Paris presented the promised epit-

ome of the several national pharmacopœias and also an outline of suggestions for further discussion. It was specifically pointed out that: "The international pharmacopœia is not to supersede national pharmacopœias but it is desirable that in the construction of the latter the fundamental principles of the international pharmacopœia should be adopted."

It was further agreed that the language of the proposed code should be Latin, that the metric system should be adopted in the formulæ of the preparations, that the nomenclature be uniform, that galenical preparations, such as tinctures, extracts, etc., should be made as nearly uniform as possible, and that the maximum admissable amount of impurity in chemical preparations be stated.

This admittedly excellent ideal was never developed and at the fifth International Pharmaceutical Congress, held in London, 1881, it was learned that the manuscript that had been prepared by the Pharmaceutical Society of Paris was inadvertently destroyed by fire and that nothing of practical value had been accomplished in the interval.

Considerable impetus to the development of an international pharmacopœia was given by the "Universal Pharmacopöe" by Bruno Hirsh. The first edition of this compilation, published in 1887, included an epitome of all of the known national pharmacopœias. The second edition of the work, published in 1902, includes 4450 separate articles and an index covering 46 three-column pages.

Even a casual comparison of the compilation by Jourdan and the later one by Hirsh evidences the fact that the rapid dissemination of news and knowledge, the introduction of the metric system of weights and measures, the tendency to eliminate inert or useless materials from pharmacopœias, and the more frequent intercommunication between the people of widely separated countries have served to bring about a gradual approximation in the names and the strength of various medicaments.

On the other hand many of the agencies which have been instrumental in bringing about this approximation also tend to emphasize the still existing differences in the name and strength of widely used preparations.

The overconservatism manifested by the stay-at-home element in medicine and pharmacy is largely responsible for the lack of progress or of practical results from the several International Congresses held previous to 1900.

As has been pointed out repeatedly these congresses were international only in name, they were never well attended and the discussions and resolutions were futile because of their being altogether too comprehensive.

At the ninth International Pharmacopœial Congress, held in Paris in 1900, Professor A. Tschirch, of Berne, reviewed the efforts that had been made to develop an agreement to secure greater uniformity in the strength and nomenclature of widely used medicines and pointed out that the several congresses had proven to be impotent because they lacked the official standing that was necessary to make their conclusions effective.

He proposed that the ninth International Congress request the Belgian Government to arrange with other governments for a conference in Brussels, and to ask that all of the delegates appointed to attend such a conference have their proposals ready to lay before the meeting whenever this may be called. It was also suggested that the conference be restricted to the discussion of the name and strength of widely used potent medicaments.

The delegates appointed by their respective governments to attend this International Conference for the Unification of Pharmacopœial Formulæ for Potent Medicaments met in Brussels, September 15, 1902. The conference included delegates from the United States and from 18 European countries.

After fully discussing a variety of propositions the conclusions were finally embodied in the form of a protocol designating the nomenclature, strength and method of preparing the several medicaments.

This protocol was subscribed to by the delegates present and these signatures were subsequently ratified by the Diplomatic Representatives of the several governments, thus giving to this agreement the status of an international treaty.

For men who are really interested in the progress of medicine, the unanimity with which the provisions of the Brussels protocol have been embodied in the several national pharmacopœias has been a revelation as well as an inspiration.

For nearly a century it had been asserted that international uniformity in pharmaceutical preparations was impractical and that the several nations could never be induced to accept for inclusion in their pharmacopœias the dictates of outside influences. The futility of these assertions is amply demonstrated by the fact that within a

single decade the total compliances with the requirements of the Brussels protocol on the part of the leading pharmacopœias of the world have been increased from less than 50 per cent. in 1902 to 95 per cent. in 1910.

While European pharmacopœias, generally, have been brought well into compliance with the provisions of the Brussels protocol the national pharmacopœias now official in North and South America mostly antedate the Brussels Conference and are therefore not in accord with the requirements.

The variations in the strength of potent medicaments now existing in the pharmacopœias used in the several countries of North and South America are well illustrated by the appended table giving the requirements of the International Protocol and the comparative strength of the corresponding preparations in the several well known pharmacopœias that are either officially recognized or widely consulted in American countries.

Of the several pharmacopœias used on this Continent the French Codex, the Spanish Pharmacopœia, and the Pharmacopœia of Mexico comply fully with the protocol of the Brussels Conference, the Pharmacopœia of the United States complies fairly well with the several requirements, while the Pharmacopœias of Great Britain, of Argentine, of Venezuela, and of Chili antedate the Brussels Conference and differ rather widely in many respects from the provisions of the protocol adopted at that time.

One rather important variation manifested by the Pharmacopœias used in North America is due to the fact that English speaking pharmacists have been trained to measure rather than weigh pharmaceutical preparations. As is well known the latter is the accustomed practice on the Continent of Europe and throughout South America, and it may be necessary for American and English pharmacists to change their mode of making preparations before the proposed international standards can be fully complied with.

The desirability of developing a uniform nomenclature on this hemisphere is well illustrated by table 2 showing the titles used in the several pharmacopœias for 3 of the articles included in the Brussels protocol: Cocaine hydrochloride, Fowler's solution and fluidextract of ergot.

One difficulty in the way of developing Pan-American uniformity in the nomenclature of pharmacopœial substances is the fact that in Spanish-America Latin titles are considered as being of but second-

TABLE SHOWING COMPARATIVE STRENGTH OF PREPARATIONS OF POTENT MEDICAMENTS INCLUDED IN THE BRUSSELS CONFERENCE PROCTOCOL AND IN THE SEVERAL PHARMACOPŒIAS USED IN NORTH AND SOUTH AMERICA.

	P. I. 1902	Ph. Brit. IV 1898 and B. P. C.	U. S. P. VIII 1905 and Spanish Edition 1909	Ph. Mex. IV 1904	Ph. Fr. V 1908	Ph. Hisp. VII 1905	Ph. Venz. I 1898	Ph. Germ. IV 1900	Ph. Chili I 1886	Ph. Arg. I 1898
Aconitum napellus (L):										
Tinctura aconiti										o
Strength	10	5w/v	10w/v	10	10	10	20	10	10	
Menstruum	A70	A.70	A7+W3	A70	A70	A70	A60	A70	A60	
Atropa belladonna (L):										
Tinctura belladonnæ		o						o		
Strength	10		10w/v	10	10	10	20		10	20
Menstruum	A70		Dil. A	A70	A70	A70	A60		A60	A60
Extractum belladonnæ										
Menstruum	A70	A70	A2 W1	A60	A70	A70	A60	W-A	A40	W
Colchicum autumnale(L)										
Tinctura colchici										
Strength	10	20w/v	10w/v	10	10	10	20	10	10	20
Menstruum	A70	A.45	A6 W4	A70	A70	A70	A60	A70	A60	A60
Digitalis purpurea (L):										
Tinctura digitalis										
Strength	10	12+5w/v	10w/v	10	10	10	20	10	10	20
Menstruum	A70	A60	Dil. A	A70	A70	A70	A60	A70	A60	A60
Uragoga ipecacuanhæ (Baill):										
Tinctura ipecacuanhæ		o	o					o		
Strength	10			10	10	10	20		20	20
Menstruum	A70			A70	A70	A70	A60		A60	A60
Syrupus ipecacuanhæ										
Strength	1	2w/v	7	1	lex	1	1	1	2	1
Hyoscyamus niger (L):										
Tinctura hyoscyami								o		o
Strength	10	10w/v	10w/v	10	10	10	20		10	
Menstruum	A70	A.45	Dil. A	A70	A70	A70	A60		A60	
Extractum hyoscyami								o		

Extractum hyoscyami.								o		
Menstruum	A70	A.70	A6 W4	A60	A70	A70	A60		A60	W
Strychnos nux vomica (L)										
Tinctura nucis vomicæ.										
Strength	10	16.6w/v	2w/vEx	10	10	10	20	10	10	20
Menstruum	A70	A70	A75W25	A70	A70	A70	A60	A70	A80	A80
Extractum nucis vomicæ										
Menstruum	A70	A70	W. AcAcet	A80	A70	A70	A80	A70	A80	A8W1
Opium:										
Extractum opii										
Requirement	20	20	20	20	20	20	20–24	20	30	20
Tinctura opii										
Strength	10	7.5w/v	10w/v	10	10	10	10	10	10	10
Menstruum	A70	A50	Dil. A	A70	A70	A70	A60	A70	A60	A60
Tinctura opii crocata			o		o		o			
Strength	10	5w/v		10		10		10	10	20
Menstruum		Sherry		A30		Wine		A35	{A20 wine}	A30
Pulvis ipecacuanhæ et opii							o			
Requirement	10	10	10	10	10	10		10	10	10
Tinctura opii camphorata						o				
Requirement	0.5	0.45w/v	0.4	0.5	0.5		0.5ex	0.5	0.5	0.5
Tinctura strophanthi									o	
Strength	10	2.5w/v	10w/v	10	10	10	20	10		20
Menstruum	A70	A70	A65W35	A70	A70	A70	A60	A70		A60
Sclerotium clavicepitis purpurea (Tul.)										
Extractum ergotæ										
Menstruum	W	60	AW	W	W	W	W	W	W	A8W4
Fluidextractum ergotæ									o	
Strength	100	100w/v	100w/v	100	100	100	100	100		100w/v
Menstruum		W+		A60	W+		A60	A20		A3W4

TABLE SHOWING COMPARATIVE STRENGTH OF PREPARATIONS OF POTENT MEDICAMENTS INCLUDED IN THE BRUSSELS CONFERENCE PROCTOCOL AND IN THE SEVERAL PHARMACOPŒIAS USED IN NORTH AND SOUTH AMERICA.—*Continued.*

	P. I. 1902	Ph. Brit. IV 1898 and B. P. C.	U. S. P. VIII 1905 and Spanish Edition 1909	Ph. Mex. IV 1904	Ph. Fr. V 1908	Ph. Hisp. VII 1905	Ph. Venz. I 1898	Ph. Germ. IV 1900	Ph. Chili I 1886	Ph. Arg. I 1898
Acidum hydrocyanicum dilutum	.....	.....	.....	.....	.....	.....	.....	0	0	0
Requirement	2	2w/v	2	1	2	2	1	.....	.....	.....
Aqua amygdalæ amaræ	.....	.....	.....	(?)	0	0	0	.....	0	0
Requirement	0.10	0	0	.....	.....	.....	.....	0.1	.....	.....
Aqua laurocerasi	.....	.....	0	(?)	.....	.....	0	0	.....	0
Requirement	0.10	0.1	.....	.....	0.1	0.10	.....	.....	0.05	.....
Aqua phenolata	.....	0	0	0	.....	.....	0	0	0	0
Requirement	2	.....	.....	.....	2	2	.....	.....	.....	.....
Sodii arsenas	.....	.....	.....	.....	.....	.....	.....	0	.....	.....
Requirement	Cryst.	Anh.	Cryst.	Cryst.	Cryst.	Cryst.	Cryst.	.....	Cryst.	Cryst.
Liquor potassii arsenitis	.....	.....	.....	.....	.....	.....	0	.....	.....	0
Requirement	1	1	1	1	1	1	.....	1	1	.....
Syrupus ferri iodidi	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Requirement	5	10	5	1	.....	5	0.6	5	2	0.5
Tinctura cantharidis	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Strength	10	1.25w/v	10w/v	10	10	10	10	10	10	10
Menstruum	A70	A.90	A95	A70	A70	A70	A80	A90	A80	A80
Tinctura iodi	.....	.....	.....	.....	.....	0	.....	.....	.....	.....
Strength	10	2.5w/v	7	10	10	.....	10	10	10	8.33
Menstruum	A95	A90	A95	A95	A95	.....	A90	A90	A90	A90
Tinctura lobeliæ	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Strength	10	12.5w/v	10w/v	10	10	10	20	10	10	20
Menstruum	A70	A60	Dil. A	A70	A70	A70	A60	A70	A70	A60
Cocaine hydrochloridum	.....	.....	.....	.....	.....	.....	0	.....	0	.....
Requirement	Anh.	Anh.	Anh.	Anh.	Anh.	Anh.	.....	Anh.	.....	Anh.
Unguentum hydrargyri	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Strength	30	48	50	30	50	30	50	33	50	50
Requirement	.....	33	25	.....	.....	50	12	.....	25	25
Vinum antimonii	.....	.....	.....	.....	0	.....	.....	.....	.....	.....
Strength	0.4	0.457	0.4w/v	0.3	.....	0.4	0.3	0.4	.....	0.4

ary importance. The Spanish name is usually given precedence, and in Mexico and Venezuela Spanish titles appear to be used almost exclusively.

In conclusion it may be pointed out that the protocol adopted by the Brussels Conference has been proven to be reasonable in its requirements, the medicaments that are included, with few exceptions, are widely used, and the nomenclature proposed, while elastic, is sufficiently uniform to be easily recognized. The several provisions have been generally adopted by the pharmacopœias of continental Europe and it is to be hoped that they will be fully complied with in forthcoming revisions of the several American Pharmacopœias.

With the desirability of instituting international standards of strength and nomenclature generally recognized, with the practicability of their introduction fully demonstrated, and with the need for a world wide science of medicine fully established, it would surely be a reflection on the scientific spirit and the progressiveness of American people if these several provisions were not included in each of our national pharmacopœias.

It is to be hoped, therefore, that the countries represented in the congress, assembled in the Metropolis of the South American Continent, will lend their influence to the further development of international uniformity in name and strength of widely used medicines and that the provisions of the Brussels protocol will be embodied in the pharmacopœia of each American nation.

TABLE I.

Showing titles for Cocaine Hydrochloride, Solution of Potassium Arsenite, and Fluidextract of Ergot, proposed in Brussels Conference Protocol and those used in the several pharmacopœias.

COCAINE HYDROCHLORIDE.

P. I.—Cocainum hydrochloricum.
U.S.P.—Cocainæ hydrochloridum.
Ph. Hisp.—Chlorurum cocainæ.
Ph. Fr.—Cocainum chlorhydricum.
Ph. Germ.—Cocainum hydrochloricum.
Ph. Mex.—Clorhidrato de cocaïna.
Ph. Brit.—Cocainæ hydrochloridum.
Ph. Arg.—Cocainum hydrochloratum.
Ph. Venz.—
Ph. Chili.—Cocainum hydrochloricum,

SOLUTION OF POTASSIUM ARSENITE.

P. I.—Arsenicalis liquor Fowleri seu Liquor arsenicalis Fowleri seu Kalii arsenicosi liquor.
U.S.P.—Liquor potassii arsenitis.
Ph. Hisp.—Solutum arsenitis potassici.
Ph. Fr.—Solutio kalii arsenicosi.
Ph. Germ.—Liquor kalii arsenicosi.
Ph. Mex.—Solución arsenical de Fowler.
Ph. Brit.—Liquor arsenicalis.
Ph. Arg.—Liquor kalii arsenicosi.
Ph. Venz.—Arsenis potassicus aqua solutus.
Ph. Chili.—Liquor Fowleri.

FLUIDEXTRACT OF ERGOT.

P. I.—Secalis cornuti extractum fluidum seu Extractum fluidum Secalis cornuti; Ergoti extractum fluidum seu Extractum fluidum Ergoti.
U.S.P.—Fluidextractum ergotæ.
Ph. Hisp.—Extractum aquosum secalis cornuti.
Ph. Fr.—Extractum ergoti fluidum.
Ph. Germ.—Extractum Secalis cornuti fluidum.
Ph. Mex.—Extracto fluido de cuernecillo de centeno.
Ph. Brit.—Extractum ergotæ liquidum.
Ph. Arg.—Extractum secalis cornuti fluidum.
Ph. Venz.—Extracto fluido de Cornezuelo de centeno.
Ph. Chili.—

NOTES ON THE QUALITATIVE AND QUANTITATIVE ANALYSIS OF OINTMENTS AND SIMILAR PREPARATIONS.

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The qualitative and quantitative determination of the constituents of an ointment (cream) used for medicinal or cosmetic purposes is usually intrusted to the analyst for the purpose of ascertaining the formula and of duplicating the original. An investigation concerning the correctness of a published formula of such a specialty is rarely the purpose of the analysis. The problem given

in the first case is generally the easier one. Notwithstanding the difficulty encountered in detecting fat, oil, wax, etc., in a mixture and the frequent impossibility of their estimation, the analyst possessing sufficient pharmacognostic knowledge may be able to combine the analytical data found with his knowledge of the materia medica to obtain a satisfactory result in duplicating the original, if this was the purpose in view. A correct qualitative and approximately quantitative determination of the principal constituents, medicinal or cosmetic, which do not belong to the excipient, viz., alkaloids, salts, sulphur, glycerin, etc., can be expected however from the analysis. The consistence of the excipient, if it should prove to be a mixture the constituents of which have been found, can be reproduced if necessary by experiment when the iodine number, saponification number, melting point, specific gravity, etc., do not give any clue concerning the proportions.

Details in reference to the ointment to be analyzed, stating its use and effect, antiseptic, anæsthetic, for inflammatory conditions, etc., or if for cosmetic purpose, bleaching and whitening the complexion, massage, liver spots, etc., often give valuable information about the ingredients which might be expected as, for example, mercury bichloride, certain alkaloids, hydrogen peroxide, salicylic acid, camphor, etc. With this preliminary knowledge one is often able to readily detect the one or the other constituent. A careful study of any literature accompanying the ointment is also advised.

A systematic arrangement how to proceed with the analysis which can be used for all cases naturally can not be given and must be worked out after making some preliminary and qualitative tests.

The following procedure is suggested:

1. Physical examination: color, odor, consistence, taste.
2. Microscopic examination.
3. Preliminary tests.
4. Analysis, qualitative and quantitative.
5. If indicated, preparation of a duplicate and comparison with the original.

In order to ascertain if an ointment is easily absorbed by the skin, its melting properties and stickiness, a little of the ointment may be rubbed in on the back of the hand, at the same time certain odors might be noticeable as, for example, the odor of cacao butter.

Microscopic Examination.—Spread a small amount of the ointment, about the size of a match's head, on a slide, using the

edge of another slide to distribute it in a thin layer over the surface. Examine first with a magnification of about 250 then 500 diameters. Repeat this after drawing slide several times through a small flame to allow fat which might be present to melt. The presence of starch, powdered drugs, crystalline or amorphous bodies, fatty acid crystals, etc., can thus be readily detected.

PRELIMINARY TESTS.—Submit a sample of the ointment in a test tube for about half an hour to the warmth of a steam bath. Water and glycerin when present will separate from fat. Salts and mineral matter may settle down or be suspended in the melted fat, for instance, lead carbonate, zinc oxide, boric acid, etc.

Determine the solubility of the excipient in ether, chloroform, benzin, alcohol, etc. Any water present must be removed by drying before applying the solvent. Starch, powdered drugs, talcum and others can be so separated from a fat-base and weighed after completely removing base with the proper solvent.

Ointments containing fats or fatty oils will give a greasy stain on paper which does not disappear on heating or exposure to the air (difference from ointments having starch paste, mucilage of tragacanth, soap, etc., as basis).

Reaction.—A strongly alkaline reaction may be due to sodium or potassium carbonate (for example in massage cream to be used for reduction). In this case shake a sample of the ointment in a test tube with hot diluted hydrochloric acid to see if there is effervescence. Zinc carbonate or calcium carbonate are frequently found in cosmetic creams.

Moisture (water) including volatile substances (volatile oils). An accurately weighed sample of the ointment, one to two grammes, is heated in a flat platinum dish at a temperature of 105° until weight is approximately constant, weighing at half-hour intervals. Too long continued drying must be avoided as fats are liable to oxidize with increase of weight. In the presence of a considerable amount of water it is recommended to mix the ointment in a platinum dish with a weighed portion of washed and freshly ignited sea sand. Considerable water can be incorporated with a fat-excipient other than lanolin and eucerin by the addition of borax, potassium carbonate or alum.

Ash.—This is preferably done quantitatively in order to save a second ignition for the quantitative analysis. Two to three grammes of the sample, which should be free from incorporated water, are

used for this purpose. A residue remaining may be used for qualitative analysis.

QUALITATIVE ANALYSIS.—*Metals.*—Three to five grammes of the ointment are reduced to ash in a porcelain crucible and the residue tested for metals in the usual way. It is a precautionary rule not to use a platinum crucible as the presence of lead (lead plaster, etc.) might damage the crucible. Mercury and its salts and arsenic, if they are present are volatilized, as are also certain salts of zinc and lead, which are more or less volatile.

Reinsch's test for arsenic and mercury. About three grammes of the ointment are boiled gently for five minutes with 5 c.c. of concentrated hydrochloric acid and 5 c.c. of water, having immersed previously a piece of clean bright copper foil. If the copper foil, after a lapse of five minutes, still presents the same appearance as it had before, no arsenic or mercury can be present. Should the copper foil, however, show a steel-gray deposit or appear lustrous-like silver, arsenic or mercury are apparently present. The copper foil is removed, washed with water, dried with filter paper and cautiously heated in a perfectly dry narrow glass tube, open on both ends. The sublimate will collect on the cooler portion of the tube. Arsenic is converted into arsenous acid, its tetrahedral or octahedral crystals are apparent under the microscope. A sublimate of mercury will be found to consist of very small globules. The hydrochloric acid used in this test must be free from arsenic. Oxidizing agents, such as nitrates, will interfere with the reaction.

Another method to test for metals (except silver) and acids is as follows: Five grammes of the ointment are repeatedly shaken with hot diluted hydrochloric acid, filtered, after cooling, through a moistened filter and the filtrate tested. Part of the filtrate may be dried down on the water bath to see if anything be left behind.

ALKALOIDS AND NARCOTIC EXTRACTS.—*Alkaloids.*—A sufficient quantity of the material is vigorously shaken with hot very dilute sulphuric acid, allowed to cool and filtered through a filter moistened with water. A portion of the filtrate is examined with two or three of the general reagents for the alkaloids, such as solution of iodine, phosphomolybdic acid or Meyer's reagent. Should a turbidity or precipitate form, the presence of alkaloids is suspected. The acid, aqueous filtrate is slightly supersaturated in a separating funnel with ammonia and the ammoniacal liquid extracted by shaking with chloroform, the latter is allowed to separate, removed

as far as possible, and the extraction repeated with another portion of chloroform. The chloroformic solutions are collected in a beaker and exposed to a gentle heat on the water bath until the chloroform is completely volatilized. Morphine is only very slightly soluble in chloroform; it can be extracted with a mixture of equal volumes of ether and acetic ether. The alkaloid is identified by the usual method.

Narcotic Extracts.—In the presence of narcotic extracts or if several alkaloids are suspected, also when considerable organic matter soluble in the acidulated water is present, it is advisable to resort to Stas-Otto's method of separating the alkaloid.

Mineral Oil, Paraffin, Vaselin, Ceresin.—Five grammes of the ointment are heated with 25 c.c. concentrated sulphuric acid at a temperature of 160° for fifteen minutes. The residue is intimately mixed with about 500 c.c. water. Vegetable or animal fats and oils, resin and wax are carbonized, any mineral oil, paraffin, vaselin, etc., present will separate on the surface of the water.

Another method is based on their indifference to alkalies as they can not be saponified. A few grammes of the material (admixtures of water, starch, salts, etc., must be removed by drying and filtration) are saponified on the water bath in an Erlenmeyer flask, closed with a small funnel, with a 4 per cent. alcoholic potash solution, shaking frequently to assist saponification. The mineral oil, paraffin or vaselin will be found floating in drops in the clear liquid. In the presence of beeswax the saponification should be carried out for at least one hour.

Substances Soluble in Alcohol.—Certain constituents can be separated from an ointment base by extracting with hot alcohol, filtering when cool and evaporating the solvent. Small quantities of wax, fat, oil, vaselin, lanolin, etc., will be dissolved at the same time, but not sufficient to interfere with a fairly accurate estimation of the alcohol soluble constituent, provided the latter is present in not too small quantities. Fatty acids, however, are more readily soluble in alcohol than fats, oils, etc. This must be taken in consideration if, for example, stearic acid is found to be present. Substances soluble in alcohol and liable to be constituents of an ointment are: resin, turpentine, balsam of Peru, tar, castor oil, croton oil, etc. Glacial acetic acid in place of alcohol can be used with advantage as a solvent in some cases. After the alcohol or acetic acid has been driven off on the water bath, the material left behind usually can be recognized from its physical appearance.

Soap.—If an ointment is mixed in a separating funnel with about three times its volume of ether and shaken with water, the latter will take up the soap. On addition of diluted hydrochloric acid to the aqueous solution a turbidity and separation of the fatty acids will take place. Instead of mixing with ether the ointment may be agitated with hot water, filtered after standing for about one hour and acidulated with hydrochloric acid as before.

Soaps insoluble in water (oleates, lead plaster) are decomposed on shaking with hot diluted hydrochloric acid, the latter dissolving the metal.

FREE FATTY ACIDS.—*Stearic Acid.*—These can be detected by treating the ointment with alcohol, filtering and adding an alcoholic solution of lead acetate. A white precipitate indicates the presence of a fatty acid. Resin and soap, however, give a similar reaction. One can also resort to the following test[1] for stearic acid: Melt a small quantity of the material in a porcelain dish, stir up the melted substance for a few moments with ammonia water and allow to cool. Remove the solidified mass from the surface, or filter through a wetted filter and acidulate the liquid with hydrochloric acid, when stearic acid will be precipitated.

Stearic acid when heated with alkali carbonates on the water bath forms salts with effervescence, giving off CO_2.

Stearic acid has a high acid number, 200–210, its admixture with fats, oils and paraffin may be suspected on finding a high acid number, when colophony, which also has a high acid number, is absent.

Resinous Substances.—Colophony, turpentine, etc. (see under substances soluble in alcohol). The presence of colophony can be detected by the following method, which was originally given in a somewhat different form by Parry for the detection of colophony in shellac.[2] The colophony is isolated from the ointment by shaking a small amount of the latter with hot strong alcohol, separating the alcoholic solution after cooling by filtration and pouring the filtrate in water. The precipitate is collected on a filter, dried, triturated with petroleum ether and filtered. If no precipitate forms and the liquid has the appearance of an emulsion, it should be evaporated to dryness on the water bath and the recovered colophony triturated with petroleum ether as before. On shaking the filtrate with a very dilute copper acetate solution, the petroleum ether will be colored emerald green in the presence of colophony.

Another color reaction for colophony has been given by Sans,[3] as

follows: On slightly heating in a test tube one to two c.c. neutral methyl sulphate with a little colophony, a rose red color is obtained which changes to violet and disappears on further heating. Neutral ethyl sulphate may be used for methyl sulphate. Resin, having a melting point of 90° to 130° C., will increase the melting point when added to fats as in cerates. A very characteristic odor can be observed on blowing out the flame of a burning ointment containing an appreciable amount of resin.

Detection of Certain Fats and Rosin by the Odor of Their Acids.—About three grammes of the ointment are saponified with alcoholic potash solution and the alcohol evaporated on the water bath. The resulting soap is taken up with water and the aqueous solution acidulated with hydrochloric acid. Tallow gives the odor of mutton broth; colophony and various other fats and resins also yield characteristic odors.

Beeswax.—Should the odor fail to give a clue, the admixture of beeswax to an ointment may be suspected from the peculiar clouds formed in a solution in petroleum ether. Beeswax is only partially soluble in petroleum ether, whereas most of the fats, oils, paraffin, etc., are readily soluble in this solvent. It is important that water, volatile substances as carbolic acid, mineral constituents have been removed before applying this test. Resin, castor oil and other alcohol soluble substances must be removed by shaking the sample two to three times with hot alcohol, filtering off and drying the remaining excipient. If about 0.3 grammes of the so prepared ointment base are dissolved in 4 c.c. petroleum ether in a test tube at a temperature of about 18° C. it will be found in the presence of beeswax that clouds, consisting of very small needles, are suspended in the solvent. Compare with a solution of a little wax in petroleum ether. To examine these needles under the microscope it is best to mix a drop of olive oil on a slide with a little of the petroleum ether containing the needles in suspension before covering with cover glass. Unfiltered wax shows pollen under the microscope.

Lanolin.—Lanolin is only very slightly saponified by an aqueous solution of potassium hydroxide; it can be saponified, however, with an alcoholic solution of potassium hydroxide, though with difficulty, preferably under pressure. For its detection, provided it can be separated sufficiently from other admixtures (either by shaking out with chloroform or removing foreign substances by shaking with

water, alcohol, melting, filtering and drying), the cholesterin reaction can be resorted to. (See Hager's Handb. der Pharm. Praxis, vol. 2, page 276.)

Glycerin.—It may be detected by melting the ointment (see under preliminary tests) or shaking out with hot water, evaporating on the water bath, purifying if necessary by taking up residue with ether-alcohol (1 + 3) and driving off the solvent. It may be identified by its sweet taste. On igniting with potassium bisulphate the odor of acrolein will be noticed.

Denige's tests are also useful.[4] The glycerin is oxidized to dioxyacetone by boiling with bromine water on the water bath, the product so obtained gives beautiful color reactions with thymol, resorcin, codein and β-naphthol in the presence of concentrated sulphuric acid. The reaction takes place either at room temperature or on heating. Thymol produces a bordeaux red color changing to pink red, on diluting. Resorcin causes a blood red color changing to yellowish red or yellow on diluting with glacial acetic acid or sulphuric acid (spec. grav. 1.8). Codein gives a greenish blue and β-naphthol an emerald green color with green fluorescence. If a solution of salicylic acid and potassium bromide is heated with dioxyacetone for two minutes on the water bath, a violet color is obtained; the salicylic acid may be substituted by guaiacol, the color produced will be a deep blue. Dioxyacetone gives the hydrazine reaction with phenylhydrazine, acetic acid and sodium acetate, the crystals can be identified under the microscope. Equal volumes of dioxyacetone solution and Nessler's reagent or Fehling's solution produce on heating a precipitate of metallic mercury and cuprous oxide, respectively.

Casein.—Frequently used in skin creams, is insoluble in water, alcohol and ether. It is soluble in dilute caustic alkali or alkaline carbonates also in diluted hydrochloric acid, containing less than 0.1 per cent. of hydrochloric acid.[5] Casein consists of about 14 per cent. nitrogen.

Borax and Boric Acid.—About five grammes of the ointment are melted in a flask and shaken with 10 to 15 c.c. warm water, acidulated with hydrochloric acid. The liquid is filtered off from fat or insoluble material when cold and tested with turmeric paper and ammonia. A negative reaction shows the absence of either borax or boric acid which, when added to an ointment, are present in nearly all cases in a quantity of not less than 0.5 per cent. Boric

acid will give the reaction with turmeric paper when shaken out with hot water; borax will give the test on setting free the boric acid, using acidulated water for extraction.

QUANTITATIVE ANALYSIS.—*Metals and Their Salts.*—A simple and sufficiently accurate method to estimate certain metallic compounds, insoluble in fat-solvents, such as zinc oxide, carbonates of zinc, lead, calcium and bismuth subnitrate when mixed with a fat excipient and no other substances also insoluble in the solvent are present, is as follows: A thoroughly dried and weighed sample of the ointment is mixed in a beaker with the proper solvent (see preliminary tests), the mixture transferred to a dried and weighed filter and the latter with the remaining substance washed with the solvent until all fat is removed. The filter with contents is allowed to dry at 100 to 105° C. until its weight remains constant. In calculating the percentage of the material thus obtained, the loss on drying the ointment must of course be taken in consideration.

For method of estimating metallic mercury in mercurial ointment see U.S.P.

A procedure for the estimation of metals in organic substances has been given by Rothe.[6] It is based on the observation that organic compounds when digested for a sufficient time with a mixture of fuming nitric acid and concentrated sulphuric acid, and subsequent heating until vapors of sulphuric acid escape, are decomposed on further heating with fuming nitric acid into carbon dioxide and water. To the material, which should be free from water, is added in a flask 10 to 15 c.c. fuming nitric acid and 2 c.c. concentrated sulphuric acid for each gramme taken and the flask heated on a sand bath until a continuous generation of gas takes place, avoiding too high a temperature. Later on the temperature of the sand bath is increased to drive off the nitric acid and cause the sulphuric acid to develop vapors. To this end the flask is heated over the free flame, after the nitric acid has escaped, until the sulphuric acid boils briskly. After allowing to cool, 5 to 10 c.c. fuming nitric acid are added and the flask heated again on the sand bath to slight boiling until the liquid turns light, which will require from one-quarter to one-half hour. Finally the flask is heated once more over the free flame to a brisk boiling until heavy vapors of sulphuric acid are given off. If the liquid assumes a brown color the organic matter is not completely destroyed and the operation must be repeated by the addition of another 5 c.c. of fuming nitric acid until

the sulphuric acid does not turn dark on boiling. Since the comparatively large amount of free sulphuric acid present may be objectionable during the final procedure, it can be driven off for the most part over a Bunsen burner without loss of metal. The last traces of the oxides of nitrogen are removed by diluting the residue with water and heating to the boiling point for a short time. The further treatment of the residue, now free from organic matter, is dependent on its chemical composition.

Alkaloids and Narcotic Extracts.—A sufficient amount of the ointment, containing about 0.03 of the alkaloid, is subjected to Stas-Otto's method and the alkaloid so separated either weighed or titrated with standard acid using cochineal as indicator. The quantity of the alkaloid found, if due to a narcotic extract, will usually give an idea of the amount of the latter.

Mineral Oil, Paraffin, Vaselin, Ceresin.—In admixtures with saponifiable fat, oil, etc. One to two grammes of the material are saponified on the water bath with an excess of a 4 per cent. alcoholic solution of potassium hydroxide. For details (see qual. analysis under mineral oil). Any volatilized alcohol should be replaced to keep volume constant. After saponification the alcohol is driven off for the most part, the mixture transferred to a separating funnel, made up with water to about 80 c.c. and thoroughly shaken with 50 c.c. of ether. The latter will dissolve the hydrocarbon, the aqueous layer retaining the soap. If the separation of the ethereal solution does not occur readily, a few c.c. of alcohol may be added to break up any emulsion by giving the liquid a slight rotary movement. The aqueous solution is removed and the ether in separator agitated with 10 c.c. of water to which a few drops of caustic alkali have been added. This is run off, the ether shaken with water, the latter removed and the ethereal solution collected in a tared flask. The aqueous liquid is twice treated in separator with fresh ether as before, each time washing the ether and adding it to the first portion. After reclaiming the ether by distillation, the flask containing the hydrocarbon is heated at 100° C. for one hour and weighed. Beeswax and spermaceti yield on saponification myricyl and cetyl alcohol, respectively, which bodies are soluble more or less in ether. Cetyl alcohol can be separated from the hydrocarbon by treating the ether residue with strong alcohol, which will dissolve it, leaving the hydrocarbon behind.[7]

Substances Soluble in Alcohol.—Proceed as stated under quali-

tative analysis, using a weighed quantity of the ointment, shaking out twice with the solvent. Drive off the latter on the water bath, dry in steam oven and weigh.

Soap.—Soluble soap, for example castile soap, may be shaken out twice with hot water, filtered after cooling, the filtrate evaporated and the soap dried and weighed. Soaps insoluble in water, zinc stearate, lead plaster, etc., can be estimated with tolerable accuracy by quantitating the metal (see quantitative analysis under metals).

Stearic Acid.—In the absence of other free fatty acids and alcohol soluble material, stearic acid may be estimated when in admixture with oils by introducing a weighed sample into a flask, adding about 50 c.c. methyl alcohol and a few drops phenolphthalein. The flask is immersed in hot water, its contents thoroughly agitated and half normal caustic alkali added until after vigorous shaking the liquid retains a faint pink color. The alcoholic liquid is separated from the oil, the alcohol evaporated and the residue taken up with water. The aqueous solution is agitated with a little petroleum spirit to remove any oil or fat, then separated and the stearic acid precipitated by the addition of diluted sulphuric acid. On shaking with ether, separating the ethereal solution and evaporating to dryness, the remaining stearic acid can be weighed.

Resinous Substances.—Proceed as given under substances soluble in alcohol (qualitative analysis), using a weighed quantity of the ointment, shaking out twice with hot alcohol (20 + 10 c.c.), cool on ice, filter, evaporate filtrate, dry and weigh. A fair approximate estimation of colophony in admixtures with neutral fats or oils can be effected by mixing the ointment with a mixture of alcohol and ether and titrating with standard decinormal sodium hydroxide solution. Each c.c. of decinormal alkali represents 0.034 colophony, taking 165 as the average acid number of colophony. Free fatty acids (stearic acid) when present in quantity, will vitiate the results.[9] This method may be used for estimating the proportions of colophony in a mixture with linseed oil used as bird or fly lime.[10]

Acid resin, such as colophony, can be separated from the neutral fats by boiling the substance with a strong solution of sodium bicarbonate or borax. After cooling, the aqueous liquid is separated from the fat and the resin precipitated from its solution by adding hydrochloric acid.[11]

Glycerin.—It may be approximately estimated after separating the fatty acids (saponification of the ointment with alcoholic potash

and acidulating with hydrochloric acid), supersaturating the liquid with sodium carbonate, evaporating, extracting with ether-alcohol (1 + 3) and weighing the remaining glycerin after drying at 90–95° C.

Borax and Boric Acid.—Two to five grammes of the sample are rendered decidedly alkaline with sodium hydroxide in a platinum dish and heated on the water bath until free from water. The residue is carefully ignited, the ash taken up with 20 c.c. water and hydrochloric acid added drop by drop, until all is dissolved. The liquid is transferred to a 100 c.c. flask, 0.5 gramme of calcium chloride, a few drops of phenolphthalein and a 10 per cent. solution of caustic soda added until a permanent slight pink color is produced. Finally 25 c.c. of lime water are added and the volume made up to 100 c.c. The solution is well mixed and filtered through a dry filter. To 50 c.c. of the filtrate sufficient normal sulphuric acid is added until the pink color disappears, then methyl orange and the addition of the acid continued until the yellow is just changed to pink. A fifth normal solution of caustic soda is now added till the liquid assumes a yellow tinge, excess of soda to be avoided. The carbonic acid is expelled by boiling, the solution cooled, a little phenolphthalein and an equal volume of glycerin added and titrated with standard sodium hydroxide until a permanent pink color is obtained.[12] One c.c. of fifth normal soda solution represents 0.0124 grammes crystallized boric acid or 0.0191 grammes borax ($10H_2O$). On titrating the boric acid 50 c.c. of glycerin should be present for each 0.1 gramme of the acid.

Chemical Constants of Fats, Oils and Waxes.—Refractive index, iodine number, acid number and saponification number. In some cases it is advisable to resort to the determination of one or several of these constants, for example, as a proof of the presence of a certain fat, indicated by physical appearance or qualitative test, and the absence of other fats or oils. For instance, an excipient is found to be lanolin from its appearance and the cholesterin reactions, yet the analyst may not be sure that no other fat, possibly lard or tallow, is also present, particularly when alcohol or water soluble admixtures have been separated previously from the fat bases and its physical character somewhat altered.

Total Nitrogen.—The determination of the nitrogen content is frequently indicated to either quantitate a constituent of the sample,

—casein, alkaloids, etc., or to show the absence of such bodies. A small nitrogen content, due to impurities in fats, oils or waxes, might, however, be met with.

Melting Point.—At least 24 hours should have elapsed since the last melting, as melted fats require a certain time to acquire their normal melting point. Products obtained by melting together beeswax, paraffin, stearic acid, etc., have a melting point lower than the mean of their constituents.[13] The presence of an appreciable amount of carnauba wax (melts at 84 to 86° C.) or rosin (90 to 130° C.) in a fat base increases the melting point. The sample must of course be free from water, salts, mineral matter, glycerin, etc.

Ash.—See under preliminary tests.

Remarks.—As a general rule water or alcohol soluble constituents are extracted by treating the sample with the hot solvent, concentrating the aqueous liquid or evaporating the alcohol, and testing in the usual way or identifying the residue from its physical character. The water and alcohol insoluble constituents are separated from a fat basis by dissolving out the fat with ether or chloroform, filtering off the solution and identifying the residue on filter either chemically or microscopically. In the presence of water soluble and water insoluble substances, for example, boric acid and zinc oxide, the former are removed as before, the remaining fat containing the water insoluble substance must be thoroughly dried before dissolving fat in solvent. Two water insoluble constituents of an ointment, for example, starch and zinc oxide, or starch and talcum, may be separated from each other after removing fat by using the proper solvent of one, viz., diluted acid for zinc oxide or incinerating starch, which will leave the talcum behind. Volatile substances as volatile oils, carbolic acid, etc., can be separated by distillation with live steam and their identification thus made easier. If a certain known odor of a volatile oil can not be identified by its name, the following method has been found practical but not very scientific. On looking over the index of the volatile oils in the dispensatory or other suitable pharmaceutical manual, one might strike suddenly the name of the oil in question or might be able to select a few for comparison with the original.

The amount of fat basis in an ointment can be estimated by dissolving a weighed sample, which must be free from water, in chloroform, making up to a certain volume and evaporating an ali-

quot part of the clear solution to dryness. Resin and other alcohol soluble substances, if present, are removed previously by shaking with this solvent.

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THE STATE CONTROL OF CONTAGIOUS AND INFECTIOUS DISEASES.*

By Dr. Samuel G. Dixon,
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"The State Control of Contagious and Infectious Diseases," the subject on which you have requested me to address you, embraces two ideas, first the general control or supervision of infections in every part of the state, whether civic or rural, and second their special, absolute control in the rural districts only.

The former relates to incorporated municipalities, cities, boroughs and townships of the first-class which are autonomous in regard to sanitary administration, the second to those quasi-municipalities known as townships, which includes also villages. In the former the State assumes no control unless municipal control should become so imperfect or careless as to render the conditions a menace to other populations, in the latter the state has absolute control, organizing the administration, formulating the regulations and appointing the officials and agents. It will be understood therefore that what I

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have to say will apply principally to the rural districts of the commonwealth.

PAST CONDITIONS.—Up to the year 1895 there had been no systematic law for the control of contagious and infectious diseases in this state. Every city and prominent borough had its own form of health government and formulated its own system of laws. In that year, however, representatives of several municipalities united with the former State Board of Health in drawing up a system of regulations for preventing the spread of such disease, which was enacted by the State Legislature and which was sufficiently comprehensive to entitle it to be denominated the "Pennsylvania Sanitary Code for the Restriction of Communicable Diseases." This at once became legally effective for every incorporated municipality in the State. But except in the case of a few townships in which the school boards availed themselves of their right to organize as boards of health the whole vast domain outside of city and borough limits was in a state of chaos so far as any regular control of such diseases was concerned.

MODERN LEGISLATION.—With the statesmanlike legislation of 1905, however, giving new powers and appropriating increased means to the health authorities, order sprang out of chaos, and a new condition of things came into being.

What was considered at that time a very liberal appropriation, three hundred thousand dollars, was given the department for the two years 1905 and 1906. So rapidly did the work grow, however, that in 1907 the Legislature appropriated to the department two million dollars. Six hundred thousand of this was specifically set aside for the establishing of the State Sanatoria for Tuberculosis and four hundred thousand for Dispensaries for Tuberculosis. Still the work continued to grow. The people gave it their hearty support and in 1909 the unprecedented appropriation of two million dollars for tuberculosis and one million dollars for general health work, was given the State Department of Health.

ORGANIZATION.—To-day the department is a well organized, fully equipped fighting force and its work along all lines of conserving public health, in which it has been engaged, has met with gratifying success.

Pennsylvania has an area of 44,985 square miles and contains 30 cities, 849 boroughs, 67 counties and 1547 townships, a total of 2426 separate and distinct municipalities, which to a certain extent

must be considered individually in all public health work. About three million of Pennsylvania's seven million population reside in rural districts. In cities, boroughs and in a few townships, namely those of the first class, provision has been made, as already said, by legislative enactment for the appointment of boards of health. Only by constant urging and untiring educational work, however, has the State Department of Health succeeded in getting many of these small boroughs to organize health boards. In over fifteen hundred townships absolutely no permanent health organization had been provided by law. This gives some idea of the broad field in which the state health authorities' work is found.

In each of sixty-six counties of the State the department has now a thoroughly trained medical inspector assisted by a corps of township health officers. There are altogether seven hundred of these health officers distributed throughout the state. To them the physicians report all cases of communicable diseases and the health officers promptly placard the premises and establish the necessary quarantine. Upon receiving notice from the physician of the termination of quarantine the health officer thoroughly disinfects the premises. As a proof of the results being obtained from educational work it has been gratifying to note the constantly increased number of requests from householders to have their homes disinfected after cases of tuberculosis.

These health officers for the past two years also have been making regular inspections of the sanitary conditions of all schools in the rural districts, and the result has been a very marked improvement of such schools.

Medical Inspection of School Children.—The department is putting in operation a system of medical inspection of the school children in the rural districts. This inspection is being made by skilled physicians.

In view of the results already accomplished by medical inspection of schools in some of the larger cities and municipalities throughout the country, we are safe in saying that the standard of health of the children in the country schools in Pennsylvania will be raised materially by this work, and that the spread of contagious and infectious diseases will be greatly curtailed.

Reporting of Contagious and Infectious Diseases.—One of the first steps taken by the department was to arrange for the reporting of all contagious diseases, as well as deaths from the same,

to the central office. At the same time it was felt that the list of diseases required by state law to be reported was extremely defective. The following additional diseases were therefore made returnable:

Anthrax, actinomycosis, glanders, trichiniasis, rabies, malarial fever, bubonic plague, measles, whooping-cough, tuberculosis, chickenpox, German measles, mumps, epidemic dysentery, tetanus, erysipelas, pneumonia, puerperal fever and trachoma.

This makes nearly thrice the number previously required to be reported by the laws of the state. In each case however, there was a reason which appeared to the department good and sufficient for requiring that the department should be made aware of its presence, and the next Legislature incorporated them all into the law.

An analysis of the specific character of each of the diseases which have been added to the report card will show that each and every one is justly entitled to be placed thereon, and that their importance is not to be denied.

Anthrax, actinomycosis, glanders, trichiniasis and rabies are all known to be communicable to man from the domestic animals and to be difficult of cure, often fatal.

Malarial fever can only be eradicated by screening every case from the Anopheles Maculipennis mosquito, while at the same time a vigorous warfare is waged against the insect itself. Bubonic plague is advancing upon us with no uncertain step and its mode of transmission is no longer a mystery. Every civilized country now makes tuberculosis reportable, while measles and whooping-cough, although scoffed at by the unthinking, cause each far more deaths than scarlet fever and smallpox combined.

During the week ending Feb. 28, 1910, among the deaths registered at the General Register Office, Somerset House, London, were 14 from measles, 4 from scarlet fever, 11 from diphtheria, 45 from whooping-cough, and 11 from diarrhœa, from smallpox 0 and from typhoid fever 0. During the three weeks previous the deaths from whooping-cough were 57, 61 and 53 respectively. Thus, during a week in which the deaths from whooping-cough were below the average, that deadly disease, so little regarded not only by the public but by the medical profession and even by the majority of boards of health, out of the victims of the nine most dangerous communicable diseases was responsible for the deaths of more than one-half.

DISINFECTION.—The control of contagious and infectious dis-

eases cannot be accomplished without the systematic and free use of disinfectants. This is recognized in all legislation on the subject. The Act of Assembly of April 14, 1903, however, took a step in advance in providing that all schools and colleges in cities in this state shall be disinfected at intervals not exceeding two weeks in accordance with a modern method and system of disinfection, such method and system to be approved by the local board of health if there be one, otherwise by the state health authorities.

Formaldehyde is a powerful disinfectant, and causes practically no injury to delicate fabrics or room furnishings and therefore is the principal disinfectant used by the state.

In using formaldehyde gas for disinfection, the air of the room should be both warm and moist. The latter condition may be effected by suspending wet sheets about the room.

An effective and economical method of generating this gas is by the addition of the official (U.S.P.) solution of formaldehyde to potassium permanganate.

Eight (8) ounces, by weight (one measure) of commercial potassium permanganate crystals is required for each pint of a solution of formaldehyde (at least 37½ per cent.) in disinfecting every 1000 cubic feet of air space.

Briefly, this method may be described as follows:

First: Secure a tin, agate-lined or iron pail with a flaring top which has a capacity at least equal to ten times the quantity of disinfectants to be used.

Second: Place the potassium permanganate crystals in the pail spreading them evenly over the bottom.

Third: Set the pail containing the crystals in a pan, metal wash tub or boiler containing water, a brick or stove lid being placed under the pail.

Fourth: Pour the formaldehyde solution from a dipper or some wide-mouthed vessel over the crystals of potassium permanganate.

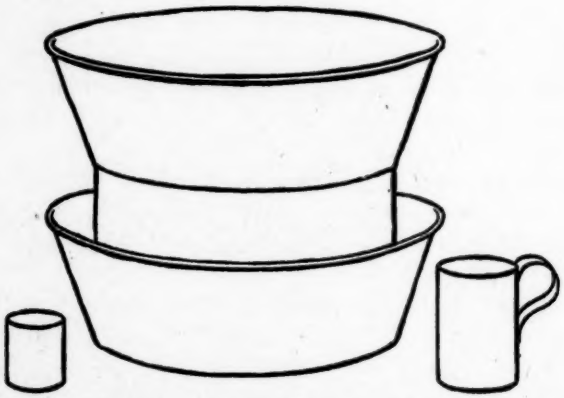
Fifth: Seal the door of exit including the key-hole and crevices about the door knob. This must be done quickly as 80 per cent. of gas is liberated during the first five minutes.

Sixth: Leave the room closed for six hours.

But observe this caution: It has been determined in the laboratories of the department that the gas so liberated is slightly inflammable. The room should be warm and moist, but under no circumstances should the chemicals be mixed and this form of disinfection

performed in the presence of a live fire or flame in the room. A separate container should be used for every pint of formaldehyde solution and proportionate amount of potassium permanganate required. It would be well to surround the vessel within which the container is placed, for a distance of at least three feet, with some absorptive material to receive any stray bubbles, thereby protecting the floor from any possibility of resulting stains.

This cut shows the Pennsylvania State Department of Health's modification of the vessel designed by the Maine State Board of Health for use in liberating formaldehyde gas from a water solution, by means of potassium permanganate.



Vessel for use in liberating formaldehyde gas from a water solution, by means of potassium permanganate. The larger funnel-shaped container measures 15 inches diameter at the top; 11 inches at the bottom, the inside depth or height of the flaring part 5 inches, and the depth or height of the lower part 6 inches. The pan measures 15 inches diameter at the top, 11 inches at the bottom and has a straight height or depth of 5 inches. The dimensions of the vessel have been fixed by empirical trial as ample for the diffusion of the gas, reducing the danger from ignition when in contact with a live flame to a minimum. The pan within which water is placed interlocks with the container proper, leaving sufficient space between the vessels for the circulation of water which protects the floor from heat generated by the chemical action. For convenience in carrying, the pan is made to nest in the top of the container proper. Three pints of liquid formaldehyde and twenty-four ounces of potassium permanganate may be safely used in this vessel without danger of overflow.

A cardinal point in disinfection is to attack the germ at the earliest possible moment after its escape from the body. Especially in all water-borne diseases, "Death in the bedpan" should be our slogan. And this leads me to call attention to the discovery in our laboratories of the presence of the germs of tuberculosis in sewage which will make it necessary to place that disease in the water-borne category, as a reasonable possibility.

PROPHYLAXIS.—Among prophylactics vaccination for smallpox is of course *facile princeps.*

So far from relaxing our legal requirements in regard to this measure we must constantly and combinedly aim to reach the German standard. When this is reached all over the world, Jenner's prophesy will be realized and smallpox will be banished from the earth.

Diphtheria antitoxin is a close second. Then follow the various serums and so-called vaccines, including the anti-rabic virus.

For the mosquito-borne diseases, destruction of mosquito-breeding areas, mechanical screening, destruction of mosquitoes in houses by the employment of fumes of narcotic plants.

For water-borne diseases filtration both of water and sewage with the addition of disinfectants in some exceptional cases.

The only drugs to which the name of specific can be applied are mercury in syphilis and quinine in malaria; but many of the serums are both prophylactic and specific, while certain of them have as yet only proven to be specifics.

The circulars of the department for the management of the various contagious diseases contain full instructions for the proper use of disinfectants as required in the case of each disease.

The Department of Health, therefore, urges upon all school directors, trustees, principals and presidents of schools and colleges outside of cities in this state the importance of protecting the health of their pupils and students, and of the entire community as well, by prompt and regular attention to this duty.

As the law provides no fixed period for rural schools, the Department of Health recommends that the desks, wood work, shelves and floors of school rooms, in addition to the customary scrubbing with soap or lye, be wiped at the end of each week with a cloth saturated with a 4 per cent. solution of liquor formaldehydi (U.S.P.).

Slates and slate pencils, if used, should be wiped off with the same. Sunlight and fresh air should be freely admitted.

At the end of each month, disinfection with formaldehyde gas should be practised.

Dairy Inspection.—The communication of typhoid fever, scarlet fever and diphtheria through the medium of infected milk is a thoroughly well recognized fact. Hence it became necessary to go to the root of the evil and institute a system of careful dairy inspection by state officers.

Every community of any size in the State avails itself of the law to prevent the sale of impure or adulterated milk, but it is left to the

State Department of Health to guard the centres where the milk is produced. Therefore, our township health officers are regularly instructed to inspect the dairy farms in Pennsylvania. The total number of dairies inspected in 1908 was 17,618. Of these 2,442 were found to be in a condition which entitled them to the highest commendation. Of the remainder many were comparatively clean and carefully conducted but failed in one or more of the eight particulars noted on the inspection card.

For instance, on 480 farms, cattle were found to be drinking polluted water. In about 2500 dairies, the floors of the stables were in an extremely filthy condition. In about the same number the milkers did not wash their hands or the udders of the cows before milking, nor did they wear any clean protective covering to prevent dust and filth from their clothing falling in the milk.

It has been gratifying to discover that so far from appearing antagonistic the dairymen have been generally most ready to co-operate with the agents of the department in the inspections and to afford every facility, appreciating that it was to their interest to comply with all the instructions furnished by us and thus secure the confidence of the public in the purity of their product.

STREAM INSPECTION.—Side by side with the work of general medical inspection, has gone the campaign for pure water. This has been conducted by a fully equipped sanitary engineering division. To stop the pollutions of the waters of the state and reclaim them as nearly as possible to their virgin purity—this is a work fraught with obstacles and yet so important to the health of our people that it invites our most earnest efforts.

Five years ago the picture of stream pollution in Pennsylvania presented a sorry sight; the individual householder constructing an overhanging privy and polluting the stream that finds its way past his property; the small town defiling with raw sewage a stream of water that is expected to quench the thirst of villagers not far away; the large municipalities discharging the contents of their extensive sewers into the river that is the water supply for thousands and thousands of human beings down stream. This had been going on for generations.

Since the organization of our Sanitary Engineering Division, 18,945 private sources of stream pollution have been abated upon notice from the department, not to speak of the thousands more that have been stopped through the moral influence of this work.

Sixty-seven modern sewerage disposal plants have been either built or are in the progress of construction as approved by the state. Two hundred and five other municipalities and private sewerage corporations are preparing to submit plans for sewage treatment, for only on condition of their so doing have they been permitted to extend their sewerage systems. Already thirty-five modern water filtration plants have been approved by the state and are either built or being erected.

The people are beginning to appreciate that sanitary methods of sewage disposal and water purification are not costly compared with the money outlay that typhoid fever demands of our State every year, not to speak of the awful harvest of misery, suffering and death that it reaps.

In view of the work that has thus been done in cleaning up the streams of Pennsylvania, it is encouraging to note that 1908 showed a decrease of 1088 deaths from typhoid, compared with 1907, in which year there were also fewer deaths by 379 than in 1906. This is in the face of a rapidly increasing population, so that the actual decrease in point of numbers does not represent the full saving in lives.

Distribution of Diphtheria Antitoxin.—I know of no work that the department has done which has been more gratifying to me personally than the saving of lives of little children by the free distribution of diphtheria antitoxin among the poor of Pennsylvania.

Since October, 1905, the Health Department has distributed 49,443 packages of antitoxin. It has treated 19,929 sick people, mostly children, who, but for the state's intervention, would have been neglected. In the old days about 10,000 of these children would have died; as a matter of fact, only 1725 died. Nearly all those who died were children who did not receive the antitoxin until the late stages of the disease. The detailed statistics of the department show that the earlier the sick child receives the antitoxin, the greater his chances of recovery. These facts should emphasize the pressing need, in all cases, not only of antitoxin treatment, but of this treatment at the earliest possible time. The department has also thoroughly tested the powers of antitoxin as an immunizing agent. Diphtheria, as every one knows, is one of the most virulently contagious diseases. It travels like lightning from the sick to the well. In the crowded homes of the poor, many of them ideal culture tubes for the growth of the microbes, its virulence is especially marked.

The department in three years has immunized with antitoxin 14,527 persons, nearly all children, who had been exposed to the disease. Of these only 251 acquired it—a little more than one per cent. The State Department of Health's free distribution of antitoxin to the poor, therefore, has saved over 8000 lives at an average cost of seven dollars each and prevented contagion in several thousands of cases at an average cost of two dollars.

I cannot too earnestly acknowledge the cordial manner in which my colleagues of the medical profession have supported me in my efforts for the control of infection. At great personal inconvenience they have performed the not inconsiderable labor of reporting contagious diseases and it is gratifying to be able to state that the more intelligent and careful physicians are now setting a good example to their less scrupulous professional colleagues by using protective gowns in making examinations in cases of communicable disease and disinfecting their persons and especially their clinical thermometers, and, in the same way, doctors of dental surgery are cleansing and disinfecting their instruments and the separate handles of the same after use in each case.

To you, gentlemen of the pharmaceutical profession, do we owe acknowledgments also for your readiness to act, entirely without compensation, as distributors of antitoxin, thus enabling the department to reach every poor sufferer in the state with the promptness which is so essential to the successful use of that agent.

Control of Tuberculosis.—As has already been stated the Legislature of 1907 gave the State Department of Health a total appropriation for tuberculosis of one million dollars and in 1909 increased this appropriation to two million dollars.

The present plan of the state governmental anti-tuberculosis work may be summarized under the following headings:

First: The collection and tabulation of statistics relating to tuberculosis through official morbidity and mortality reports of each individual case.

Second: The establishment of one or more sanatoria for the treatment of incipient cases, including infirmaries for advanced and hopeless cases.

Third: The establishment of dispensaries in each county of the state for the care of cases which cannot avail themselves of sanatorium treatment, including home visitations and the study of occupational conditions.

Fourth: The maintenance of pathological laboratories for the free examination of sputum and tuberculous lesions and biological laboratories for the possible development of immunitive and curative products.

Fifth: The restriction of tuberculosis by the disinfection of rooms, buildings (private and public), conveyances and carriers, and by supervision and regulation over the general avenues of infection.

Sixth: The dissemination of knowledge relative to the communicability, care and prevention of tuberculosis.

The collection and tabulation of statistics relating to tuberculosis is the first essential work in the campaign against this disease as it is in the war against all communicable diseases. The law of the commonwealth now requires that a physician shall report to the health authorities each and every case of tuberculosis occurring in his practice.

Up to December 31, 1909, 2365 patients had been admitted to the Pennsylvania State South Mountain Sanatorium near Mont Alto. The present capacity is 720. This Spring, ground has been broken by the Department of Health for a second sanatorium on the beautiful tract of land at Cresson, which Andrew Carnegie so generously gave the commonwealth for that purpose.

It is also a pleasure to be able to announce that Mrs. B. F. Jones, of Pittsburg, has expressed her interest in the sanatorium scheme by offering the department a commodious dwelling house and lot close by the tract given by Mr. Carnegie. This will enable us to commence the reception of patients at Cresson during the present Summer without waiting for the completion of the larger buildings.

Ground has also been purchased for the erection of a sanatorium at Hamburg among the beautiful hills of Berks County, which will be easy of access for the teeming populations of Philadelphia and the eastern counties.

Tuberculosis Dispensaries.—Pennsylvania leads the entire country in the number of dispensaries it has established for the treatment of tuberculosis. One hundred and fourteen of these dispensaries have already been established at as many points in the state. Up to December, 1909, 21,227 poor tuberculous sufferers had received medical aid and the attention of trained nurses which these dispensaries provide.

Each dispensary is in charge of a chief physician, from one to

thirteen assistants, and one to five nurses according to the number of patients under treatment, and is open at convenient hours, day or evening, to accommodate the occupational demands of those who are able or who are compelled to work. The location has been determined with a view of reaching the most populous centres. The great object of the dispensary is to reach each individual case of tuberculosis and by competent medical advice, treatment and supervision ameliorate or entirely relieve the physical condition and at the same time to educate the people as to the communicable character of this disease, to the end that others may not become infected through ignorance or carelessness. The dispensary nurses are required to make visits to the homes of dispensary patients and advise as to the methods of personal hygiene and home sanitation; instruct non-infected persons of the household as to the dangers, and how to avoid infection; to spread the doctrine of fresh air, sunlight, rest, proper foods, temperate habits, and compliance with the instructions of the medical advisers; and at the same time to discover unsuspected cases.

In all the larger dispensaries the "class system" has been inaugurated. Under this system classes are organized among the patients, each of which contains not over twenty-five members. The number of classes varies, being governed by the needs of the individual dispensary. The classes meet at regular intervals, some weekly, but usually every two weeks. The members are instructed to take and record their own temperature, pulse and respiration. This they do as frequently as the class leader may direct. Not only do the patients record these particulars, but they are also instructed to make careful notes of their condition, feelings and actions. Memorandum books are supplied for this purpose.

At the class meetings patients are encouraged to converse among themselves and compare notes as to their experience. The note books are submitted to the inspection of the class leader, who carefully reviews each one. Faults are pointed out, and misfortunes discussed with a view of avoiding their repetition and minimizing unfavorable consequences. Often the ingenuity of one patient will be of great assistance in solving the difficult problems of another. Patients are weighed and the result commented upon.

Indigent dispensary patients are supplied with nitrogenous foodstuffs in the shape of milk and eggs. In addition to food supplies the dispensaries furnish liberal quantities of paper napkins and

bags, pressed paper sputum cups for use in tin forms and pocket cuspidors.

Earnest effort is made through the dispensaries to educate the people in each community to a sense of the value of thorough room disinfection. The Department's Health Officers are instructed in the work of disinfection and supplied with the necessary equipment. A postal card sent to any health officer will secure his speedy attention. Not only the dispensary physicians, but every practitioner in Pennsylvania, is supplied with a list of the names and addresses of the health officers located in his own and adjoining counties.

The following, translated from the Report of Prof. F. Egger, the delegate from the Federal Council of Switzerland to the recent International Congress on Tuberculosis at Washington, is of interest as showing the impression made on an intelligent and cultivated foreign expert, by the part which our state is taking in the great world movement for the control of tuberculosis. Professor Egger says "Instructive as it would be to become acquainted with the excellent regulations of the States of Maryland, Massachusetts and others, we must content ourselves with sketching the measures adopted by the State of Pennsylvania, partly as we observed them personally and partly as they were presented in an admirable collective exhibit accompanied by a catalog full of reliable information at Washington." After giving quite a full account both of the Mount Alto Sanatorium and the Dispensaries, he says:

"If I have taken pains to depict the noble undertakings of America in the field of the contest against tuberculosis this has been done not only in candid admiration and recognition of their achievements but also with the object of showing our country what energy and self-sacrificing public spirit can accomplish."

If you have followed me in this somewhat prosy discourse you will have noted that the policy of the department in attempting the control of contagious and infectious diseases has been to lay the axe at the root of the tree, to embrace all, not only a few, communicable diseases, to insist on receiving information of every case, to make isolation and quarantine real and not perfunctory, although carefully modified as the nature of each disease may permit, to make disinfection thorough and complete, performed with real germicides, not simply bad smelling deodorants, and to use them where they will do the most good, to keep disease-breeding organisms out of our water and out of our milk as well as out of our air, to educate

our people to the cardinal virtue of cleanliness, and to lead the ignorant and disaffected to appreciate that the state government, so far from desiring to oppress them, is their best friend, ever ready to protect, advise and help them in their illness and misfortunes.

Convinced of the cardinal truth that the greatest defence against tuberculosis is a sturdy, vigorous human system which in turn can only be built up by an adequate supply of wholesome nourishing food, it undertakes to instruct the mothers of families in the selection of foodstuffs so that the greatest amount of nutriment may be procured for the least expenditure of money, and how the food may be cooked in such a way as to be most easily digested and have its nutritious properties most thoroughly conserved.

Thus through the physician and the nurse the state government comes very near to the unfortunate consumptive. Instead of being a cold and heartless abstraction, relentlessly working out its function of ruling, regardless of the suffering which may follow, it enters in a very real way into his life.

Heretofore, misled by the propaganda of the foreign anarchist, he has regarded the state with jealous suspicion as his natural enemy, whose principal object is to impose upon him oppressive laws and regulations, interfering with his personal liberty and taking his little all in exorbitant taxes. Now, to his surprise, he wakes up to find in his hour of trouble that the government is his thoughtful friend, ready to instruct him in better ways of living, how to get good wholesome food, and how to make his money go as far as possible in buying it, nay even when sickness has robbed him of his hard earned store, ready to furnish him the food best suited to restore him again to health and usefulness. It will be strange indeed if such treatment does not take the kinks out of his warped and twisted consciousness and lead him to become, instead of an anarchist, a friend and supporter of the state.

THE PENNSYLVANIA PHARMACEUTICAL ASSOCIATION.

By Edgar F. Heffner, Secretary.

It affords me a great deal of pleasure to have the honor of talking on the work and objects of our Association in this College, which has contributed more than any other institution toward the success of our state organization by furnishing many of the active workers, who have used the knowledge and training received here to aid in improving drug conditions, and to place the Pennsylvania Pharmaceutical Association in first place in the ranks of the state organizations.

The efficiency of our organization and the high character of the original material secured each year by our efficient chairman of the Committee on Papers and Queries, Professor LaWall, have time and time again brought forth strong commendations from the Pharmaceutical Press, which should be very gratifying to our members.

In point of actual dues-paying membership the Pennsylvania Association also leads, as we have nearly 1000 members who are in good standing, but in the number attending the meetings each year we are lamentably low, and are being put to shame by associations having half our membership. It is a crying shame that the work of our Association is only appreciated by one out of ten members to the point of his attending the meetings, and many think that the policy of holding the meetings at summer resorts each year for the past ten years is to blame and has been responsible for the low attendance.

So I am here to-day as an advance guard of an "On to Philadelphia" movement for 1911, and to endeavor to enlist your aid in making this year's meeting the largest and best meeting we have yet held.

Measures of vital importance to every retail druggist will be before our meeting, and in order that these measures may most nearly represent the sentiment of the best of our Association it is very essential that you attend the meeting and get as many of your friends and neighbors to go as you can.

It would be quite a relief to the officers and committee-men to have the "Anvil Chorus," who as a rule do not attend the meetings, make a change and come to our meeting this year. The

chances are that they would appreciate more the spirit that enters into our work, and become boosters instead of knockers.

Mr. Apple's paper in our Proceedings for last year impressed me greatly as being in part a solution of our difficulty in getting members to attend. In his paper he strongly urged the advisability of meeting next year at Philadelphia.

It is a fact that nearly 400 of our members are located in this city and probably 200 more within a convenient distance, over half of whom would attend the meetings. More of our inland members would attend a meeting here than at a summer resort, as it would give them a chance to purchase stock, and besides a large city at any time of the year appeals more to us "country fellows" and our wives. So for the good of the cause I ask you to attend this year's meeting and boom Philadelphia as a meeting place for 1911.

Our Executive Committee have during the past week sent out a circular letter to each retail druggist in the State setting forth strongly the advantage and reasons why they should become members.

This work has been supplemented by a letter to each member sent out by Mr. William E. Lee, chairman of the Membership Committee, asking each one to do his share toward securing the applications of those they know who are not now members. These appeals should certainly produce good results and will if you make a personal application of them and get busy.

Practically all of the laws regulating pharmacy in this State have been secured by or with the direction and assistance of our Association and are mile posts on the road of our progress toward our ultimate goal, "The restriction of the dispensing and sale of medicine to regularly educated Druggists and Pharmacists."

As a further step in that direction a draft of a law modelled after the New York and Ohio laws will be submitted to our Legislative Committee for consideration and approval in time to be presented to this year's meeting.

There is a considerable demand in the interior of our State for a law restricting the sale of medicines by grocers and peddlers. The unjust competition of these unqualified persons is an injustice to the pharmacist, who has spent at least four years to qualify himself and who is held to strict account for what he sells, while these people sell poisons and dangerous drugs with impunity and no regard for the law.

Any wholesaler doing a country-store business will tell you that more laudanum is sold by country grocery stores than by drug stores, and it is as a rule sold indiscriminately without any attempt to comply with the law.

This proposed law will restrict the sale of medicines (except proprietaries) in all cities of the first, second or third class, to registered pharmacists, provide for the registration of all country stores desiring to sell medicines in original packages, and will prohibit the issuing of a certificate to any store situated within one mile of a properly manned drug store. It will also place a prohibitive yearly license of $240 on all wagon and house-to-house medicine peddlers, street hawkers, etc.

We will never have a more favorable time to push a law of this kind, as the present cocaine agitation and the unusually receptive condition of the public toward restricting the sale of drugs which has resulted, can be used to good advantage.

It is probable that the State Pharmaceutical Examining Board will ask our Association to endorse an amendment to the present Cocaine Law making the penalty more severe and providing for an appropriation large enough to vigorously enforce the act all over the State. As you are well aware the present campaign against the cocaine evil in this city will about exhaust the financial resources of the Board, and the State should certainly make ample provision for the enforcement of laws for the public good instead of compelling the Board to use the examination fees collected from applicants for registration, which should be used only for enforcing the present pharmacy and registration laws.

At the last meeting of the State Association a committee was elected, with ex-President Walton as chairman, to draft a model Anti-Narcotic Law, and submit it to the Association for approval at this year's meeting. This Committee at the present time are awaiting the action of Congress, two bills of a similar nature having been introduced but not acted on up to this time.

It is my personal opinion that independent of the action of Congress this Association should endeavor to obtain a law placing stringent restrictions on the sale of morphine, codeine, and preparations containing these alkaloids in quantities sufficient to enable them to be used as a narcotic.

The evils resulting from the present careless sale of these narcotics are more widespread and vastly more terrible than the evils

resulting from the use of cocaine, as there are 100 victims of these drugs to one of cocaine.

Cocaine habitues are only found in isolated spots, mostly in the larger cities, whereas every little village or town is daily adding to the large army of those who are " Walking in the valley of the shadow of Death " by way of the opium route.

In our city, which I find no worse than other cities in the State, there are no users of cocaine at all, but over twenty-five regular users of morphine and opium, and in our county, containing about 25,000 people, I could not find one case of cocaine habit but found 100 would be a low estimate of the number of regular users of narcotic drugs.

I do not think the proportion in the larger cities is any less, so in your city alone it would be safe to estimate that there are over 8000 victims of the morphine habit and in the State more than 25,000.

Students of the social problem claim that a large proportion of prostitutes are victims of narcotic drugs, and there is no doubt but that a great many have fallen from respectable womanhood to the lowest depths through the use of morphine and opium.

Our Association should go on record not only as favoring such a law, but as using every means to secure a Law which will limit the use of these dangerous drugs to legitimate purposes.

A better and fairer law can be drawn by our Association than by persons knowing nothing of the actual conditions, and as a law will be passed eventually it would be only a matter of business wisdom for us to lead instead of being whipped into line.

What this may mean to us can be shown by a single example. The insistance of President Wallace as chairman of the Legislative Committee on the insertion in the Drugs Law of the Label exemption clause, and the declaration only (not percentage) of the presence of the specified drugs saved every druggist in the State the immediate expenditure of from $10 to $25 for new labels, and also from the danger of violating the law in not giving exact percentages which in some cases would be hard to figure out.

In conclusion I extend to you all on behalf of the State Association a cordial invitation to come to Buena Vista on June 28, 29 and 30. You will enjoy your vacation in Pennsylvania's most beautiful and delightful mountain region at a time of the year when all nature is at her best, and in addition your presence and interest will aid in the work for the advancement of Pennsylvania pharmacy.

CORRESPONDENCE.

A CORRECTION.

To the Editor American Journal of Pharmacy:

Please note that there is a typographical error in the last issue of your Journal. Instead of "sodium arsenate," on page 204, line 35, it should read "sodium arsenite."

Very truly yours,

May 14, 1910. Elias Elvove.

BOOK REVIEWS.

Theorie der Gewinnung und Trennung des Ätherischen Öle durch Destillation. (Grundzüge einer allgemeine Destillationslehre) von C. von Rechenberg. Mit zahlreichen Abbildungen und Tabellen. Bearbeitet im Auftrage der Firma Schimmel & Co. in Miltitz bei Leipzig. Selbstverlag von Schimmel & Co. Miltitz bei Leipzig. (Für den Buchhandel: L. Staackmann, Leipzig), 1900.

The present work is a comprehensive presentation of the theoretical principles involved in the distillation of ethereal oils and the separation of the various constituents through this process. It may in addition be regarded as a handbook on the fundamental principles of distillation and furnishes besides a valuable contribution to phyto-chemistry as well as applied chemistry. In the preface it is gratifying to note also that the second edition of the work on "Ethereal Oils," by Gildemeister and Hoffmann, is being prepared by Dr. E. Gildemeister and that this will cover two volumes, the first volume of which will probably be published before the end of the present year.

There is probably no other class of substances employed in medicines and in the arts which are so extensively used, and which at the same time are commercially of such varying quality and of which the users have so little knowledge, generally speaking, as the essential oils. We are greatly indebted to the firm of Schimmel & Co. for their pains in supplying valuable and authentic information for the benefit of the trade, as well as assistance of chemists; and for their generous employment of scientific members of their staff and also special chemists in correlating the results obtained in the

routine manufacture of essential oils on a large scale as well as for their special scientific investigations on new essential oils. The example thus furnished is one that may well be emulated, as already stated in a previous reference to the publications of this firm (JOURNAL, vol. 76, 1904, p. 214), for after all the manufacturer of medicines and like products must be guided by the same ideals as to the purity and efficiency of his products and in the discovery of new and valuable substances, as the practioners of medicine and the teachers in medicine and pharmacy, if the practice and the theory are to go hand in hand. In other words, the manufacturer of medicines and pharmaceutical products can no longer afford to think alone of the commercial gains on his products, but must at the same time be imbued with a motive similar to that which impels the teachers and practitioners in the professions named to devote their lives to their chosen work with but secondary concern as to the pecuniary rewards.

The present volume, which is by von Rechenberg, might well be employed as a text-book by organic chemists, as it treats of the scientific principles involved in distillation processes in a manner which is illuminating and indeed inspiring. That this is not overstated is seen in the mere mention of the contents of the fourteen chapters of which the book is comprised: (1) Practice of distillation. involving a study of the action of steam in plant and oil distillation; (2) Dalton's law of diffusion; (3) distillation of mixtures of insoluble fluids; (4) distillation under reduced or increased pressure; (5) distillation at high temperatures; (6) the chemical-physical changes preceding and incident to plant-distillation; (7) special examples of distillation, as of lavendar flowers in Southern France, the distillation of herbs in Spain, cajuput distillation in Ceram, cassia leaves in Southern China, the distillation of coniferous plants in Switzerland, the distillation of cananga flowers in Java, of rose petals in Bulgaria and linaloe wood in Mexico; (8) the influence of molecular association and dissociation in the process of distillation; (9) the influence of higher temperatures with and without pressure upon individual substances; (10) a chapter in general upon solutions; (11) the distillation of mixtures bordering on more or less soluble constituents; (12) the distillation of homogeneous mixtures at temperatures less than the boiling point; (13) the distillation of homogeneous mixtures not having a constant boiling point; (14) the distillation of labile addition compounds, and the distillation of homogeneous mixtures with maximum boiling points. H. K.

PHILADELPHIA COLLEGE OF PHARMACY.

SPECIAL LECTURES, 1909–1910.

MODERN METHODS OF FOOD MANUFACTURE was the subject of the ninth lecture of the series. The lecture was delivered on Friday, February 11, at 3.30 P.M., by Mr. L. S. Dow, of the Heinz Preserving Co., Pittsburg, Pa., and was illustrated by means of lantern slides. Prof. Samuel P. Sadtler, in introducing the speaker remarked upon the special interest of this topic to the food analyst and also on the interest which the public is beginning to manifest in the subject of pure and wholesome foods.

The lecturer dwelt more especially on the practice of food preserving. He enumerated the various methods and agents used in the preserving art, tracing their use in some cases back to pre-historic times. In discussing the older and newer theories regarding putrefactive and fermentative changes in food products, he spoke in part as follows:

"Modern food preserving in its broader adaptation may be said to have had its origin in the discovery by the Frenchman, Appert, in 1804, that an article of food first heated, then hermetically sealed and sterilized, would keep practically as long as the seal was intact, without the use of chemical assistance.

"In Appert's time and indeed, until recent years, it was generally thought that the things essential to the preservation of food in this manner were the exclusion of air and the application of gentle heat to cause a fusion of the principal constituents and ferments, in such a manner that the power of the ferments would be destroyed.

"One year later, de Heine, then in England, patented a process by which he claimed that food could be preserved by completely exhausting the air with an air pump. All attempts at this, however, seem to have been unsuccessful, until a process patented by Wertheimer in 1839 came to be used. This provided that the food to be preserved should be placed in tin or metal cans, the interstices being filled with water, juices or other fluid, and the lid securely sealed. The cans were then set in water and boiled, the air being expelled through small holes pierced in the lids. When the food was sufficiently cooked and the air entirely driven out, the holes were filled with solder, completing the process. Food thus treated would remain in a perfect state almost indefinitely. No very great improve-

ment has since been made upon that method and no change at all in the principle. And, while the theory of these men differed from that accepted by modern science, the same means were used and the same results obtained as to-day; the process here described being used in all large canning factories in America, as well as the countries abroad, and in principle at least, practised in every household in which fruits and vegetables are preserved.

"It is through the investigations of later scientists however—particularly, of Pasteur—that the food preserver has been shown that it is not the oxygen of the air which causes fermentation and putrefaction, but bacteria and other microscopic organisms."

The subject of food adulteration received a share of attention and that of chemical preservatives was considered at some length. With regard to the latter, Mr. Dow said, "The first objection to their use, and I believe the most glaring abuse that exists to-day, lies in their employment for the purpose of preserving partly spoiled and ill-cared-for vegetables and fruits." He claimed that every product of fruits and vegetables with which he was familiar could be successfully made in a commercial way without artificial preservatives, and that this was evidenced by the fact that the entire product of at least fifty, and probably more, leading American food preservers, is entirely free from these substances. Speaking specifically of benzoate of soda the lecturer contended that so long as a doubt exists as to its harmlessness or harmfulness, the people rather than the manufacturers should be given the benefit of that doubt. After calling attention to the use of this chemical as a preservative for cannery waste, which is worked up into ketchups and soups, and for other similar purposes, the lecturer stated that he had no hesitation in saying "that the principal use of benzoate of soda and like substances in modern food manufacture, is either to permit the use of a lower grade of material, or carelessness in process."

In concluding his address Mr. Dow said that sterilization is the chief reliance of the modern food preserver, and that in the case of fruits and vegetables in which the color or taste would be affected by a comparatively high temperature intermittent sterilization at low temperature is employed. F. Y.

APRIL PHARMACEUTICAL MEETING.

The stated pharmaceutical meeting of the Philadelphia College of Pharmacy was held Tuesday, April 19, at 3 o'clock, Henry C. Blair presiding.

Mr. Edgar F. Heffner, of Lock Haven, Pa., secretary of the Pennsylvania State Pharmaceutical Association, presented a paper calling attention to the work of that Association and setting forth some of its present aims, particularly along legislative lines, which will be published in a later number of this JOURNAL. In introducing Mr. Heffner the chairman spoke of the efficiency of his work as secretary of the Association and remarked upon the promptness with which the annual volume of Proceedings had appeared.

The paper elicited a prolonged discussion which centred mainly on the proposed State Antinarcotic Law, a subject made doubly interesting by reason of the crusade being waged at present in Philadelphia by the State Pharmaceutical Examining Board for the eradication of the cocaine evil. Among those participating in the discussion were Wm. E. Lee, chairman of the Pa. Ph. A. Membership Committee, L. L. Walton, chairman of the Committee appointed by the Association to draft a model Antinarcotic Law, Henry Kraemer, Theodore Campbell, a member of the Pennsylvania State Legislature, Otto W. Osterlund, C. B. Lowe, C. A. Weidemann, E. M. Boring, and Messrs. Heffner and Blair.

Mr. Walton stated that his committee had not as yet drafted the proposed law, as they had been waiting for Congress to frame a national law with the object of making the Pennsylvania State Law conform to it. He said that they had asked the opinions of druggists in all parts of the State as to the character of such a law, and he then read extracts from the acts of the following states: Massachusetts, Virginia, New Jersey, Michigan, Florida, Idaho, Alabama, Wyoming and Wisconsin. According to *The Apothecary* (April, 1910, p. 14) the provisions of the new Massachusetts Narcotics Law, as finally enacted, are as follows:

> Under this law it is now unlawful for any person to sell, furnish, give away or deliver any opium, morphine, heroin, codeine, or preparations thereof, or any salt or compound of the foregoing substances, except upon the written prescription or order of a lawfully authorized practitioner of medicine, dentistry or veterinary medicine, which prescription must bear the name of the person giving it; provided, that the provisions of this section shall not apply to sales made by any manufacturer, wholesale or retail druggist, to other

manufacturer, wholesale or retail druggists; nor to sales made to hospitals, colleges, scientific or public institutions, or to physicians, dentists or veterinary surgeons; nor to the sale of cough remedies and other domestic and proprietary preparations; provided that such preparations are sold in good faith as medicines, and not for the purpose of evading the provisions of this act, if such preparations do not contain more than two and one-half grains of opium, or one-third of a grain of morphine, or one-fourth of a grain of heroin, or one grain of codeine or their salts in one fluidounce; or if a solid preparation, in one avoirdupois ounce, excepting liniments and ointments which are prepared for external use only; nor to preparations containing opium or any of its salts, which are sold in good faith, for diarrhœa, cholera or neuralgia; nor to powder of ipecac and opium, commonly known as Dover's powders; nor to compound medicinal tablets, pills or powders containing not over one-twentieth of a grain of morphine, or one-twelfth of a grain of heroin or one-fourth of a grain of codeine, or any of their salts to each pill, powder or tablet; provided, that such preparations are sold in good faith as medicines and not for the purpose of evading the provisions of the act.

Mr. Walton further remarked that personally he was in favor of reasonable legislation, that he believed that the legitimate uses of opium and morphine should be considered and that in enacting an antinarcotic law no necessary impediments should be placed in the way of such use. He said that the handling of habitues presented a difficult problem, as to prohibit entirely the use of the drugs to which they were addicted, would no doubt end in collapse and possibly death in some instances. Mr. Walton added that he had written a prominent New York firm asking for the record of their sales of cocaine, and that the firm's reply was that they were not required by law to keep a record of sales of this drug outside the State of New York.

Professor Kraemer said that the Pennsylvania cocaine law appeared to be very effective and that it ought to be a comparatively easy matter to introduce a clause providing for the similar regulation of the sale of morphine and its derivatives. He pointed out that in framing legislation of this kind the work of local, state and national organizations should be co-ordinated, and expressed the opinion that an interstate law bearing on the sale of poisonous drugs will probably be framed ere long, as this is a matter in which some of the Government departments have much interest.

Regarding the dose of morphine used by habitues, Mr. Lee stated that an instance had come to his notice where 15 grains were used daily, and Mr. Blair stated that he had understood that the taking of 1 drachm daily was not unusual.

Mr. Campbell stated that he had never sold morphine to habitues, and that he had had no opportunity of ascertaining the amount of the drug used by them. He was of the opinion that there would be no difficulty in getting the Pennsylvania State Legislature to pass a law regulating the sale of morphine and codeine so long as it did not apply to household remedies containing them, for immediately the question would arise as to what the people in the outlying districts would do. Mr. Campbell felt that there were a good many loopholes and " good faiths " in the Massachusetts law, and thought that the proposed Pennsylvania draft should not have these.

Mr. Osterlund coincided with this latter view, and stated that having been acting as a juror recently, he found that lawyers have no trouble in getting around the " good faith " clauses. He stated that the laws in the western states appeared to have fewer of these.

Dr. Lowe spoke of one drug store where a profit of $60 a day was made from the sale of cocaine. He discussed the treatment of habitues, and said that one could hardly imagine the tortures of habitues when deprived of the drug, and referred to one case where 13 grains were taken at a dose and another instance where the daily dose was ⅓ ounce.

Dr. Weidemann said that he favored one feature of the proposed antinarcotic law, which Mr. Walton mentioned, namely, the drafting of the law in such a manner as to take into consideration the question of habitues. In this connection he mentioned the case of a dressmaker who he said had taken 2 fluidounces of the tincture of opium every day for the past forty years, and he felt that it would be wrong to deprive such an one of the drug. On the other hand, he said that something should be done, and that it was better to take measures to prevent the formation of the habit than to try to cure habitues.

Mr. Walton remarked at this point, that while the Massachusetts law has too many loopholes, it is still an example of what can be done. He said that there is only one way to accomplish the end sought, and that is by restricting the sale of morphine and this class of drugs to prescriptions, and then asked if any of those present thought that this could be accomplished.

Mr. Heffner spoke of the case of a young girl who used a pint of laudanum a week, and stated that she had recently been taken to a hospital for treatment by the administration of gradually decreasing doses of the drug, and that the result would be reported.

Mr. Blair, referring to Mr. Walton's question as to whether Pennsylvania ought to have a stringent morphine law, said that in his store, which is a very old one and owned successively by his grandfather, his father and himself, no morphine had been sold over the counter for three generations, and that at the present time he does not sell laudanum over the counter. He gave it as his opinion that morphine should not be sold to habitues, and said that he would favor a stringent law provided that it could be enforced. He said that there were eight habitues of the drug in his block, one of them being a total wreck, but that none of them ever came into his store for the drug.

Following the discussion of Mr. Heffner's paper Professor Kraemer called attention to the circular letter which had been sent out by Dr. Reid Hunt, chairman of the Committee on U. S. Pharmacopœia of the American Medical Association, asking for opinions regarding the function and scope of the Pharmacopœia and as to the general principles which should govern admissions and deletions. Those taking part in the discussion of the questions formulated in the circular were Dr. Horatio C. Wood, Jr., Dr. George D. Rosengarten, F. M. Apple, Professor Kraemer and Mr. Blair.

Methods for increasing the attendance at the annual meetings of the Pennsylvania Pharmaceutical Association were discussed by Messrs. Lee, Blair, Campbell, Boring, Lowe, Osterlund and Weidemann.

At the close of the discussion, Professor Kraemer called attention to a growing plant of Sarracenia vario which had been sent from Tampa, Fla., by Hamilton Russell, P.D., and to one of a fossil fern obtained from the coal mines of Shenandoah, Pa., and presented by Roy Hughes, a student of the College.

A vote of thanks was tendered the speakers of the afternoon and the donors of the specimens.

FLORENCE YAPLE,
Secretary pro tem.

MEDICAL EDUCATION IN THE UNITED STATES AND CANADA.

A report to the Carnegie Foundation for the advancement of teaching, by Abraham Flexner, with an introduction by Henry S. Pritchett, President of the Foundation, New York, 1910.

This volume of 346 pages is to be had, practically for the asking, and should be read, studied, and inwardly digested by every physician, every pharmacist, and every educated layman in these United States.

Part I consists of 180 pages divided into 14 chapters, and presents a survey of the history of medical education in this country, and a comprehensive discussion of the various problems that are involved in the present day effort to advance the requirements as well as the scope of medical education.

Part II contains a detailed report of the observations made in the course of a systematic inspection of the medical schools of the United States and Canada. This portion of the report is alphabetically arranged by states and provinces and includes, among other information, statistics relating to the population of the several states, the number of physicians and the ratio of physicians to inhabitants.

The report also discusses the more important local features and records in detail, the requirements, resources and facilities of the several schools.

An appendix contains a table showing the number of professors and other instructors in the faculty, the enrolment, fee income, and the budget of the several schools by states.

Finally, a rather complete index of 8 double column pages facilitates reference to any one particular feature or institution that is discussed.

No book published in recent years is destined to have a more far-reaching influence on the development of the educational institutions of our country, and therefore on the progress and wellbeing of the people themselves, as this volume which depicts in terse but always readable language the development or lack of development of the widely varying institutions more or less loosely classed as medical schools.

The President of the Foundation, in the introduction, points out that "one of the problems of the future is to educate the public itself to appreciate the fact that very seldom, under existing conditions, does a patient receive the best aid which it is possible to give

him in the present state of medicine, and that this is due mainly to the fact that a vast army of men is admitted to the practice of medicine who are untrained in sciences fundamental to the profession and quite without a sufficient experience with disease."

As an illustration of the inadequate nature of medical training, at the present time, it is pointed out that nearly one-half of the 150 medical schools in this country have an annual income of less than 10,000 dollars, while by far the greater number of schools attempt to limit their expenses to the fees received from students.

The existence of so many weak or inefficient medical schools would indicate a lack of professional patriotism on the part of those who were instrumental in their founding while the fact that at the present time the number of weak schools is actually being reduced, despite the monetary loss that is necessarily involved, is perhaps the most significant indication of progress in matters medical.

It should be noted that, indirectly, this book is the most severe arraignment of pharmacy, its ideals and its achievements that one would care to see. Looking ahead there is no mistaking the evidence that it is an indication of what we as pharmacists must measure up to, if we wish to continue to take an active part in developing the sciences of medicine and it most assuredly constitutes a warning that should not be ignored.

Some day, and that perhaps not in the far off future, the spirit, ideals and facilities of our pharmaceutical schools will be investigated and commented upon much in the same way as are the resources and possibilities of the medical schools in this volume.

So long as pharmacy essays to be an integral part of medicine it must live up to and comply with the requirements that are being made of those engaged in the practice of medicine itself, and pharmaceutical schools dare not lag far behind the requirements that are being made of medical colleges.

To the American Medical Association the active members of which have done and are now doing such yeoman service in calling attention to the overproduction of uneducated and ill-trained medical practitioners, this volume is a tribute that no amount of disparagement by otherwise interested individuals can counteract.

As noted above, however, every pharmacist who is interested in the progress of the sciences of medicine or in the public welfare should read and ponder over this report for himself.

The book may be obtained by enclosing 17 cents for postage with a request to: The Carnegie Foundation for the Advancement of Teaching, 576 Fifth Avenue, New York.

M. I. WILBERT.

TUBEROUS ROOT OF *Ipomœa Horsfalliæ*, HOOKER

About one-half actual length